asserted his right of property by incising the name of VARIUS. There have been found two seals separated from their settings—the one a cornelian stone, on which is a figure of Mercury, and the other of jasper, on which is the figure of a Roman soldier; and in the works of the early period was dug up mineral coal, showing that the Romans had discovered, at an early period of their occupation, that in Northumberland there was, beneath the surface, a material calculated to mollify its climate.

JOHN CLAYTON.

31*st December*, 1867.

MILITARY ROADS OF THE ROMANS AND INCAS.

THE design and structure of the Roman Wall from the Tyne to the Solway have long engaged the attention of antiquarians and historians. The noble volume, of which a third and very elaborate edition has recently been given to the public by the industry of our able Secretary, Dr. Collingwood Bruce, has left nothing further to be desired in explanation of this great military road and rampart. The general design of this work is thus briefly described by Dr. Bruce—

"This great fortification consists of three parts:

1. A Stone Wall, strengthened by a ditch on the north.
2. A Turf Wall or Vallum to the south of the Stone Wall.
3. Stations, Castles, Watch Towers, and Roads, for the accommodation of the soldiery and the transmission of military stores."

In the following paper I propose simply to offer to your attention the description given by Humboldt and others of the great military roads constructed in Peru by the powerful monarchs called Incas who ruled that empire for many centuries before the Spanish conquest.

I do not, indeed, profess to contribute any novel facts or original information regarding those mighty and magnificent works; but if, by collating some of the statements which have been made by travellers and historians of indisputable authority, I can point out evidences of design and structure of a parallel character with those of Asiatic and European origin, such analogies almost irresistibly lead the mind to those periods of remote antiquity when the human race formed one family, and derived their knowledge of the primitive arts of design and structure from the same sources of knowledge.

I now proceed to read the paper which has been drawn up by a skilful and industrious friend of mine, well known to many of my hearers.

It is compiled principally from a popular work entitled "Bell's Geography," with which I am not myself familiar, but which embodies in a condensed form the reports of that distinguished traveller, Humboldt, and the Spanish historians, Sarmiento and Garcilaco de la Vega, so largely quoted by Prescott in his "History of the Conquest of Peru.

The following account, although given in a popular work, viz. "Bell's Geography," (vol. vi. 120,) affords some particulars which I do not remember in the account read from Humboldt.

"The chief proofs of Peruvian grandeur, industry, art, and civilization, are found in the public roads, aqueducts, and buildings. From the market place of Cusco issued four roads,[1] running towards the extremities of the empire, in the direction of the four cardinal points. These running north and south were each 1,500 miles in length. One was carried along the sea shore, through the plains, and another along the high ridge of the Andes, which still remains in many places entire—a work of stupendous labour, carried over mountains and valleys, and at heights equalling that of Mont Blanc. This road was 15 feet broad, paved with large and smooth flags,[2] and fenced with a bank of turf on each side; and to preserve, as much as possible, the level of the road, the hollows were filled up, and eminences levelled. At proper distances, *tambas*, or houses of lodging,[3] accompanied with other buildings for store-houses, were erected. . . . Even in civilized Europe it was long before such useful modes of facilitating communication were adopted. The Roman roads, so justly admired for their length, solidity, and durability, and as monuments of former power and high civilization, were destroyed by barbarian inroads; and at the time when the Spaniards entered Peru, no European state could boast of any work to be compared with these great public roads of the Incas. As the Peruvians were unacquainted with the use of the arch, and from the want of tools could work only on a limited scale in wood, they could not construct bridges either of stone or of timber over the innumerable and impassable torrents which crossed their great roads; so they adopted the device of rope-bridges similar in construction to the *sangkas* or rope-bridges constructed by the natives of Thibet and Northern Hindustan. In the lower plains the rivers were passed in *balzas* or floats furnished with masts and sails. . . . In this, the Peruvians excelled all the American tribes, who were acquainted only with the oar. . . . Remains of the aqueducts (says Humboldt) are still found in the maritime part of Peru, extending from three to four miles. . . . The solidity of their stone structures was astonishing. Their architecture indeed was limited to the wants of a nation of mountaineers; it had

[1] From the *groma*, or four cross roads, at the Forum, the nucleus of the city, even the illustrious name of Roma itself is by some conjectured to have been derived.—W. S. G.

[2] Blocks or slabs of stone are probably to be understood.—W. S. G.

[3] These correspond with the caravanserais of the East, and are attributed to the Incas.—W. S. G.

neither columns, nor pilasters, nor circular arches. Inhabiting a rocky country and elevated plains almost destitute of trees, they were not led, like the Greeks and Romans, to imitate in their architecture the details of a construction in wood. Simplicity, symmetry, and solidity, were the principal features of Peruvian buildings. . . . The ruins of the Temple of the Sun at Cusco are formed of stones 15 and 16 feet square, and which, though of the most irregular shapes imaginable (as the Peruvians were ignorant of the art of hewing them to a particular form), are yet 'joined so exactly that not the least void is perceptible.' Acosta mentions some stones which were 38 feet long, 18 feet broad, and 6 feet thick. . . . The stones are still more remarkable for the beauty and variety of their shapes than for their size, and were for the most part joined together without any cement. It is not however strictly true that the Peruvians were ignorant of the properties and use of mortar. Humboldt and his companions recognised cement in the walls of Cannar (a palace of the Incas). Its walls are of freestone, 20 feet high, and, including the fortifications, more than 480 feet long. The cement of these walls and the other buildings at Llano de Pullal is a mixture of small stones and argillaceous marl, which effervesces with acids, and is a true mortar. Humboldt detached it in considerable portions with a knife, by digging into the interstices left between the parallel layers of stone. Not only this marly mortar was employed in the great edifices . . but even a kind of asphaltum or bitumen was used —a mode of construction known on the banks of the Euphrates and the Tigris from the remotest antiquity."

So much for Bell's account.

The most curious coincidence observable in the old buildings is the exact resemblance of the doorways (at least in the oldest buildings, which appear to be in Cusco,) to the Etruscan buildings, both in shape and mode of decoration. (See Ferguson's "Hist. of Archit." p. 157, original edition.)

Cusco was surrounded, like a Roman city, with water—the most remarkable, perhaps, of all the existing remains of the ancient Peruvians.

The water and the oldest temples exhibit a gradation in which the regular squared masonry is elaborated out of the polygonal style, and it corresponds curiously enough with the gradual progress of art in Latium or any other European seat of ancient civilization where the Cyclopean or Pelasgic remains are found.

Mr. Bollaert, in a paper entitled "Ethnological and Antiquarian Researches in Peru", communicated to the British Association in 1857, considers the roads as the most extraordinary monument sof the ancient Peruvians, for, although they were ignorant of iron, these gigantic roads are built of large blocks of a hard stone fitted together with the greatest nicety. He thinks the Incas probably built some of their cities on the ruins of those of a more ancient nation; but, Ferguson, in his "History of Architecture," appears to consider that the walls of Cusco belong to the age of the earliest Incas, or about the twelfth century.

Mr. Bollaert mentions some curious remains called the Pintados. These are early rock sculptures which resemble "The White Horse" in Wiltshire. They are on the rocky cliffs, surrounding what appeared

to have been ancient burial places; and he mentions a large *double circle*, and a block of granite sculptured with circles and serpents.

Many objects have been discovered in Peru that afford links in the ethnological chain of connection between the Old World and the New. Objects found in tombs of the Peruvian aborigines resemble in design certain Grecian vases. Customs of the ancient Egyptians are recalled to mind by Temple's description of some old Peruvian customs. But, above all, the *language of Hindustan* is found in the names of many places, mountains, and other natural objects in Peru,[4] and it is not to be forgotten here, that the rope-bridges of the Peruvians seem to have been derived from North Hindustan.

Further investigation may render highly probable the conclusion that while the Latin and Sabine settlers—an Indo-European race—were founding Rome, a people from Hindustan were forming roads and raising buildings in Peru that resemble those works of the Romans with which we are familiar in Europe.

The Incas—those Old Priest-Kings of Peru—had reigned for at least four hundred years before the coming of the Spaniards, but the roads, and the temples, tombs, and similar works, must be the monuments of a much earlier civilization, which had probably passed away before the Incas appeared.

Some of the authorities cited in Prescott's "Conquest of Peru" (Introduction, pp. 57, seq.) seem likely to elucidate the question whether there are constructional resemblances to Roman work. See particularly Humboldt's "Vues des Cordillères," 294, and Ulloa's "Voyage to South America," 1806, London.

To these pages I desire to add a few remarks by way of supplement.

If we take for granted, as we are bound, the truth of Holy Writ, we know from thence that mankind, which up to the building of the Tower of Babel had existed as a common family (B.C. 2247), was then divided into tribes by the adoption of different languages, and dispersed from the regions of Central Asia into all the quarters of the world.

It would appear from a consideration of the architectural works of the highest known antiquity, that the arts of design and structure in masonry were limited to certain of these emigrant tribes, who carried along with them the qualities of a more advanced civilization than fell to the lot of the rest. Such, for example, as travelling east founded the Chinese and Indian empires, and such as travelling west became the founders of the Assyrian and Egyptian dynasties, and from thence proceeded, in after times, through Persia and Asia Minor to the regions of Greece and Italy.

These tribes, and these alone of the countless multitudes which overspread the earth, seems to have cultivated and brought to the highest perfection the arts of design and construction.

It is really wonderful to observe within how limited a zone of the earth's surface those countries are contained, the inhabitants of which,

[4] Many examples are given in Moor's "Oriental Fragments," pp. 420, seq.

4000 years ago, dwelt in walled cities, and reared Pyramids, and temples, and towers, and obelisks, which are the still remaining records of ancient grandeur.

The inhabitants of Arabia, one of the most ancient peoples, to this day avoid walled cities and dwell in tents, as in the time of Abraham.

The savage tribes of Africa, even the semi-civilised Abyssinians, have scarcely advanced beyond the construction of a wigwam. Many, like the Troglodytæ of old, dwell in caves and holes like their congeners the apes and baboons.

These are they of whom Horace speaks as living "sub curru nimium propinqui Solis in terrâ *domibus negatâ*."

The barbarians of Northern Europe, the ancient Gauls, Germans, Huns, and Scythians, were little superior. Of these latter Virgil writes in his celebrated description of the Scythian winter:—

> "Ipsi in defossis specubus secura sub altâ
> Otia agunt terrâ, congestaque robora totasque
> Advolvere focis ulmos, ignique dedere."—*Georgic. iii.*

No better was the condition of the ancient Britons, Celts and Picts, the Scandinavians, and the Asiatic Tartars and Tungusians.

If we pass to the New World, the Aboriginal inhabitants are equally ignorant of the arts of civilisation; and the tribes of Esquimaux to the north, and those of "Tierra del Fuego" to the south, exhibit some of the most degraded examples of the human race in stature and habits, recalling exactly the description given by Tacitus of the ancient Fenni, which I am again tempted to cite as an example of the graphic power and singular conciseness of that historian:—"Fennis mira feritus, fœda paupertas: non arma, non equi, non Penates—victui herba, vestitui pelles, cubile humus: sola in sagittis spes, quas inopiâ ferri ossibus asperant."

The empires of Mexico and Peru as they formerly existed seem to constitute the sole exceptions to the universal character of the Aborigines of all other countries of the globe, save those who branched off directly from the first centre of civilisation.

From what source, then, did the rulers of these nations derive their inspiration? Who was that Manca Capac revered by the Peruvians, as the founder of the dynasty of the Incas, and the teacher of the arts of civilisation and of masonry, which were carried to so high a pitch; from whence did he come? This appears to be one of that class of questions which are easier asked than answered, and is a problem which I shall certainly not attempt to solve upon the present occasion.

RAVENSWORTH.